

KARLI

Kid-friendly Augmented Reality for Primary School Health Education

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Background: Health Education & AR

- *Health knowledge* = factual knowledge, theoretical understanding of information and practical skills related to health topics [1]
- integration of health education into the Austrian primary school curriculum
- complexity of content might be challenging for children
- Augmented Reality (AR) can help present complex topics more comprehensibly [2]
- *Piaget's Stage Theory of Cognitive Development*: cognitive development differs considerably throughout the childhood stages

KARLI: Kid-friendly Augmented Reality Learning Interface

- AR Android smartphone app
- children 8-10 years old
- based on the Austrian primary school curriculum
- 3D exploration of the human heart
- AR mode and Quiz mode
- marker-based AR - *KARLI worksheet*



User study

- Evaluation of **usability**, **perceived learning experience** and **task appropriateness** of the KARLI prototype
- with **38 pupils** and **3 teachers** at partner school Neuhofen/Krems primary school
- two in-school testing sessions á 30 minutes
- pupils worked in small groups (4-5 people), sharing a smartphone
- *KARLI feedback questionnaire and teachers' questionnaire*

RQ1: “What is the perception of primary school pupils in terms of usability and perceived learning experience using KARLI?” – usability, perceived learning experience

RQ2: “What is the perception of primary school teachers in terms of task appropriateness regarding the in-school use of KARLI” – task appropriateness

Questionnaires

KARLI feedback questionnaire

- based on the Fun Toolkit [3]
- *usability, perceived learning experience*
- additional questions on use of KARLI and smartphone use in general

Teachers' questionnaire

- based on Nielsen's Usability Heuristics and the Child Usability Heuristics [4]
- *general usability, kid-friendliness and in-class use*

Feedback-Fragen
Jetzt bist du gefragt - bitte hilf uns, KARLI noch besser zu machen!

Wie hat dir KARLI gefallen?

Gefällt mir gar nicht Gefällt mir nicht Geht so Gefällt mir gut Gefällt mir sehr gut

Welche Funktionen würdest du wieder verwenden?

Erforschen mit Augmented Reality Quiz	Ja	Vielleicht	Nein

Was hat dir am meisten Spaß gemacht?
Schreibe deine Rangordnung (1. - 2. - 3. Platz) in das Kästchen.

Erforschen mit Augmented Reality
 Quizfragen beantworten
 Arbeitsblatt ausfüllen

Lernen mit KARLI:

Ich kann KARLI gut bedienen. ja nein

Ich konnte die Fragen mit KARLI beantworten. ja nein

Ich mag KARLI mir beim Lernen neuer Lehrinhalte. ja nein

Ich würde mir das Lernmaterial mit KARLI im Unterricht einsetzen. ja nein

Smartphones & du:

Ich habe ein Smartphone gut bedienen. ja nein

Ich besitze ein eigenes Smartphone. ja nein

Ich besitze das Smartphone meiner Eltern, Geschwister, Freunde oder anderer Personen. ja nein

Ich benutze ein Smartphone, um damit zu lernen. ja nein

Results

- **usability**

- 97% of the pupils liked KARLI “(very) much”

- **perceived learning experience**

- 97% wished to use the app in class
- 92% indicated it would help them for learning new content
- the majority enjoyed AR/Quiz mode and would like to use it again

- **task appropriateness**

- 94% of the total 228 blanks were filled in correctly
- all three teachers “(totally) agree” on general usability, kid-friendliness, and in-class use
- teachers approved its future use



Results of the Fun Ranking, part of perceived learning experience: “Please rank AR, Quiz and Worksheet according to what you enjoyed the most.” (1 = most, 3 = least)

Discussion / Conclusion / Outlook

Health education is fundamental for future health decision making.

KARLI can be used as additional teaching and learning material for providing pupils with a comprehensible experience of the human body using AR. Overall, the children were satisfied with using the app for completing the cloze on the worksheet, and our app proved to be a sufficient tool for doing so.

To fulfill user needs, a major aspect when designing for children is the strong dependency of the design on the target group's age and cognitive development. Compared with KARLI, this seems to lack in previous comparable applications. Child-appropriateness should also be ensured during evaluation, e.g. by using kid-friendly usability testing tools.

Further research might use pre-/post-test designs to evaluate learning outcomes and comprehension compared to traditional teaching / learning materials or other educational apps.

References

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